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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/561,048

12/14/2005

Shinji Nishimae

60004-109US1

3964

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EXAMINER

LISTVOYB, GREGORY

ART UNIT

PAPER NUMBER

1796

NOTIFICATION DATE

DELIVERY MODE

11/12/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/561,048	Applicant(s) NISHIMAE ET AL.	
	Examiner GREGORY LISTVOYB	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 1-4, 7-10 and 14-16 is/are allowed.
- 6) ☒ Claim(s) 5, 6, 11, 12 and 17-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

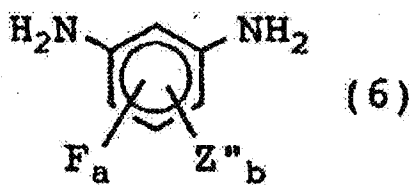
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-6, 11-12 and new claims 17-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Masayoshi et al (EP 1275679, enclosed with Application examined) herein Masayoshi in combination with Hazen et al (US 5011997) herein Hazen and Andrews et al ("Proton magnetic resonance spectra of some 2-substituted 1,3 phenylenediamines and their N, N'diacyl derivatives, Aust.J. Chem, 1971, pp.413-422, enclosed with Application examined) herein Andrews (All references cited in the previous office Action, necessitated by Amendment) and Pfirmann et al (US 3897498) as evidences by Zengel et al (US 5410082)

Masayoshi discloses a fluorinated phenylenediamine of the following formula (6)
(see page 11, line 031):



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where Z" denotes a chlorine, bromine, or iodine atom, preferably a chlorine atom or a bromine atom, and most preferably a chlorine atom, a denotes the number of fluorine atoms bonded to a benzene ring, representing an integer of 0 - 4, preferably 0, 3, or 4, and b denotes the number of "Z" "bonded to a benzene ring, representing 0 - 4, preferably 0, 1, or 4. In the preceding formula, when "Z"" is present plurally (namely, b denotes an integer of 2 - 4) in a benzene ring, each Z' may be same or different. In the foregoing formula, the total of a and b ought to be invariably 4 (namely, $a + b = 4$).

The above formula (6) is identical to one of Claim 1 of the Application examined and used for the same purposes of polyimide synthesis.

Masayoshi teaches 1,3-diamino-2,4,5,6- tetrafluorobenzene, and 5-chloro-1,3-diamino-2,4,6-trifluorobenzene (see page 11, line 031), which are identical to diamine of the Claim 1.

In reference to Claims 5-6, 11-12 Masayoshi teaches a method of making of a polyamic acid and a polyimide based on the above diamine, where tetracarboxylic acid dianhydride is based on variety of divalent organic radicals (see page 12, line 033) at the presence of organic solvent (see page 12, line 35).

Masayoshi does not teach a method for the production of a fluorinated aromatic diamine from corresponding diamide.

Pfirmann teaches a method for the production of phenylenediamine which comprises a steps of reacting a fluorinated amide (see Example 2, where Difluoro with NaOX (wherein X stands for a chlorine atom (Cl)) at a molar ratio of the NaOX to the diamide (NaOX/diamide ratio) in the range of 1-5 (column 3, line 5) and NaOH at a molar ratio of the NaOH to the diamide (NaOH/diamide ratio) in the range of 1-30, preferably 5-10 (see column 4, line 5).

Pfirmann demonstrates that his method produces pure product with low amount of by-products (see Column 3, line 35) and high yield. In addition, Pfirmann's method is economically sound, since it takes place in low temperature (see Column 3, line 35) and completes in 1-4 hours (see Column 3, line 15).

Therefore, it would have been obvious to a person of ordinary skills in the art to use Pfirmann's reagent ratios to obtain amine from amide by Hofmann rearrangement in order to obtain economically sound process, obtaining high purity an high yield product.

Note that Pfirmann does not teach the above amide/NaOCl or amide/NaOH ratio in his examples.

According to MPEP 2123, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments (see also *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971), *In re Gurley*, 27 F.3d

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551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994) , *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Pfirmann does not teach diamides and corresponding diamines.

Hazen discloses a method for the production of a fluorinated aromatic diamine (see Column 2, line 45) which comprises steps of reacting a diamide with NaOCl (Sodium Hypochlorite, see Column 3, line 10) at a molar ratio of the NaOCl to the diamide (NaOX/diamide ratio) in the range of 2.1 -2.2 (see Column 4, line 25).

Hazen teaches that the above Hoffmann rearrangement process results in a product of high purity (more than 95%) and high yield (see Column 5, line 15), which is much higher compare to ones of traditional methods (yield is within the range of 26-42%, see Column 1, line 20). It makes this process very attractive for production of raw materials for polyimides.

Andrews discloses preparation of Isophthalic-based diamine from corresponding diamines with Hoffmann rearrangement. He teaches that the NaOH to the diamide (NaOH/diamide ratio) is 2.25 (see page 416), which is within the claimed range.

Therefore, it would have been obvious to a person of ordinary skills in the art to use Hoffmann rearrangement method disclosed by Hazen or Andrews for production of

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high purity diamines. It makes the process of the following manufacture of polyimides more economical and resulting polymers with better properties.

Regarding Claims 4 and 8-10, fluorinated phenylenediamines which are produced with Hazen or Andrews's method would be expected to have molar absorption coefficient at 450 nm of not more than 2.51/mol cm, due to their high purity.

Note that in Hazen process a molar ratio of the NaOH to the diamide (NaOH/diamide ratio) is higher than 6.

Zengel teaches a method for production of phenylenediamines by Hoffmann rearrangement (see Abstract and Column 1, line 30).

Zengel evidences that optimal NaOH/diamide ratio is 6:1. He demonstrates that compare to high ratio, his process is more selective toward diamine (see Column 7, line 5) and produces higher yield, permits to use more concentrated reactants and therefore, well adapted to large-scale commercial production.

In addition, Andrews discloses preparation of Isophthalic-based diamine from corresponding diamines with Hoffmann rearrangement. He teaches that the NaOH to the diamide (NaOH/diamide ratio) is 2.25 (see page 416), which is within the claimed range.

Therefore, it would be obvious to a person of ordinary skills in the art to use NaOH/diamide ratio of 6:1 or lower, since it provides process, which is more selective toward diamine, produces higher yield and permits to use more concentrated reactants and therefore, well adapted to large-scale commercial production.

Allowable Subject Matter

Claims 1-4, 7-10, 14-16 allowed.

The closest prior art found (Masayoshi, Hazen, Andrews, Pfirrmann and Zengel) do not disclose the new limitation of claim 1: "upon completion of the reaction, adding an alkali to adjust the pH of the solution to be in the range of 9 to 14".

Response to Arguments

Applicant's arguments filed 6/25/2009 have been fully considered but they are not persuasive.

Regarding Pfirrmann, Applicant argues that the reference does not suggest using a NaOH/diamide ratio of 1.8-4.0, required by amended claim 1.

Examiner disagrees. As admitted by the Applicant, Pfirrmann also teaches the broad NaOH/diamide range of 1-30. Therefore, all above range is within Pfirrmann disclosure and can be applied as prior art.

Regarding Zengel, Applicant submits that optimal NaOH/diamide ratio is 6:1.

However, Zendel suggests that He demonstrates that compare to high ratio, his process is more selective toward diamine (see Column 7, line 5) and produces higher yield, permits to use more concentrated reactants and therefore, well adapted to large-scale commercial production.

Examiner agrees with Applicant's argument that the new limitation of claim 1: "upon completion of the reaction, adding an alkali to adjust the pH of the solution to be in the range of 9 to 14" does not disclose in the prior art. Therefore, all independent and dependent claims containing this limitation are allowed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY LISTVOYB whose telephone number is (571)272-6105. The examiner can normally be reached on 10am-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/

Supervisory Patent Examiner, Art Unit 1796

GL